

## REMARKS

Claims 1-12 are pending in this case. In an Office Action mailed December 14, 2005 Claim 6 was rejected under 35 U.S.C. § 112. Claims 1-4, 6, 7, and 9-11 were rejected under 35 U.S.C. § 102(b). Claims 5, 8, and 12 were rejected under 35 U.S.C. § 103(a). Claims 1, 2, 10, 11 and 12 have been amended. In view of the remarks that follow, applicant respectfully submits that all claims are in condition for allowance.

### Claim Rejection Under 35 U.S.C. §112

Claim 6 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention. Applicant notes that Claim 2 has been amended in response to the Office Action. The Office Action states that in dependent Claim 6 "there is insufficient antecedent basis" for the limitation "'the concentric surfaces'" in line 2. In response, applicant has amended Claim 2, upon which Claim 6 depends, to recite "the spin die has two generally cylindrically shaped **concentric** surfaces and the workpiece is formed during spinning of the workpiece to conform to the shape of both generally cylindrically shaped **concentric** surfaces." Support for this amendment is found at page 5, lines 2-4, and page 6, lines 12-17 of the specification.

### Claim Rejections Under 35 U.S.C. § 102

Claims 1-4, 6, 7, and 9-11 have been rejected under 35 U.S.C. § 102. First, Claims 1-4, 6, 7, and 9-11 were rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as being obvious over Japanese Patent No. JP 63-309339, issued to Suzuki (hereinafter "Suzuki"). Second, Claims 1, 4, 6, 7, and 9 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,694,791, issued to Johnson et al.

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(hereinafter "Johnson"). Applicant's analysis focuses primarily on independent Claims 1 and 10, because dependent Claims 4, 6, 7, and 9-11 include all the features of these independent claims.

Anticipation requires the presence of a single prior art reference disclosure of each and every element of the claimed invention. Because none of the cited references fully discloses the invention as now claimed, none of the references is anticipatory.

Claim 1, as presently amended, recites a method of making conical connectors for use in HVAC ducting. The method comprises placing a conical connector that is open at both ends and is of 22-26 gauge metal into engagement with a spin die that has at least one generally cylindrically shaped surface portion, spinning the conically shaped workpiece that is open at both ends about its longitudinal central axis, and forming the conically shaped workpiece that is open at both ends as the workpiece is spinning to conform either one or both longitudinal ends of the workpiece to the shape of the spin die generally cylindrically shaped surface portion.

Claim 10, as presently amended, teaches the formation of a mating flange according to the method of Claim 1. The mating flange is formed at either one or both of the longitudinal end portions of the workpiece by spinning the workpiece and as the workpiece is spinning, expanding the either one or both of the end portions of the workpiece to form a generally annularly shaped mating flange portion extending generally transversely to the longitudinal central axis of the remainder of the workpiece.

First, the Office Action sets forth the position that the Suzuki reference discloses a substantially similar method of placing a conically shaped workpiece (R1) into engagement with a spin die (16) having cylindrically shaped portions that form surfaces of different diameters (20, 21) and forming the workpiece as it is spinning by roller (18), and that furthermore the spin die is positioned within the workpiece. Applicant respectfully disagrees.

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The Suzuki reference discloses a method for forming the rear wheel rim of an automobile. An eccentric die (16) is positioned within a workpiece. The conically shaped workpiece has one capped, or closed end, and one open end. The eccentric die attaches to the workpiece by engaging the center hole of the workpiece with the eccentric pin (17). Thus the attachment between the workpiece and the eccentric die necessitates a closed, flat end at one end of the workpiece in order for the eccentric pin to be engaged.

In contrast, applicant discloses a spin die that is positioned within a frustoconical workpiece that is open at both ends. The spin die is inserted within the workpiece. However, the spin die is not required to be attached at one end of the workpiece. The workpiece may be shaped with two open ends, as opposed to the single open end and single closed end as required by the Suzuki reference. Applicant's method may therefore be used to make conical connectors that are open at both ends, as opposed to the bowl-shaped product of the Suzuki reference. Therefore, it would not be possible using the method of the Suzuki reference to shape a conical connector that is open at both ends, as recited in the claimed embodiments.

Regarding Claims 10 and 11, the Office Action also sets forth the position that the Suzuki reference discloses a substantially similar method of forming a transverse flange against an underside of the bottom of the die (16) and producing a hem (19) during the spinning process. Applicant respectfully disagrees.

Per the Office Action Suzuki is said to disclose a transverse flange and hem that are formed against an underside of the bottom of the eccentric die (16). The eccentric die is within the capped, conical workpiece. As a result the flange may be formed only at the open end of the workpiece, not at the capped end. In addition, the hem portion extends away from the flange and does not overlie the end of the workpiece. In contrast, applicant teaches a method of forming a mating flange at either one or both of the longitudinal end portions of the workpiece. The hem

section is created by forming the outer perimeter portion of the mating flange to extend away from the surface of the mating flange to overlie the corresponding end of the workpiece and to be disposed substantially concentrically to the longitudinal central axis of the workpiece. Thus there is no teaching or suggestion in the Suzuki reference of a flange that may be formed at either one or both longitudinal end portions of the workpiece, as recited in the claimed embodiments. Furthermore, there is no teaching or suggestion in the Suzuki reference of a hem section that is formed from the outer perimeter of the mating flange to extend away from the surface of the mating flange and that overlies the corresponding end of the workpiece, as recited in the claimed embodiments.

As an alternative to the 35 U.S.C. § 102(b) rejection discussed above, the Office Action sets forth the position that it would be obvious to one skilled in the art at the time of the invention to use a thin material to form a lightweight product. However, applicant teaches that current manufacturing techniques limit the gauge of material used to produce conical reducers to about 22 gauge (page 2, line 1). While it may be obvious that a thinner material produces a lighter product, it would not be obvious to use the thinner material, up to 26 gauge, considering current technological limitations.

Second, the Office Action sets forth the position that the Johnson reference discloses a substantially similar method of placing a conically shaped workpiece (16, figure 9) into engagement with a spin die (72) having cylindrically shaped portions (78, 80) that form surfaces of different diameters, forming the workpiece as it is spinning by roller (18), and that furthermore the spin die is positioned within the workpiece. Applicant respectfully disagrees.

Like the Suzuki reference, Johnson reference discloses placing a capped, or closed-end cylindrical workpiece into engagement with a spin die. The Johnson reference discloses inserting a spinning mandrel (72) with cylindrically shaped portions into the workpiece. The

workpiece is then inserted within an upper die unit (84), and the mandrel forces the workpiece into grooves within the upper die unit. The workpiece is forced outwards into the die unit, forming splines (50) on the workpiece. The workpiece itself remains closed at one end and has only one open end.

In contrast, applicant discloses a spin die that is positioned within a frustoconical workpiece that is open at both ends. The spin die is inserted within the workpiece. The workpiece may be shaped with two open ends, as opposed to the single open end and single closed end as required by the Johnson reference. Applicant's method may therefore be used to make conical connectors that are open at both ends, as opposed to the bowl-shaped product of the Johnson reference. Therefore, it would not be possible using the method of the Johnson reference to shape a conical connector that is open at both ends, as recited in the claimed embodiments.

In addition, the Johnson reference discloses using metal with a gauge of 0.155 inch (column 2, line 53). This is equivalent to approximately 8 or 9 gauge. In contrast, applicant discloses the use of 22 to 26 gauge metal, which is much thinner. Therefore, it is not obvious under Johnson to use a considerably thinner gauge metal given current technological limitations.

In view of the above remarks, applicant respectfully submits that the rejections of Claims 1-4, 6, 7, and 9-11 under 35 U.S.C. § 102 are all improper because Suzuki and Johnson fail to teach, or even suggest, each and every element of the claimed embodiments. For example, Suzuki fails to teach a method of making a conical connector that is open at both ends and is of 22-26 gauge metal, as now recited in Claim 1; conforming either one or both longitudinal ends of the workpiece to the shape of the spin die, as now recited in Claim 1; forming a mating flange at either one or both of the longitudinal end portions of the workpiece, as now recited in Claim 10, or forming a hem section that extends away from the surface of the mating flange and overlies

the corresponding end of the workpiece, as now recited in Claim 11. As another example, Johnson fails to teach a method of forming a conical connector that is open at both ends and is of 22-26 gauge metal, as now recited in Claim 1. Accordingly, applicant respectfully requests that the rejections under 35 U.S.C. § 102 be withdrawn.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 5, 8, and 12 have been rejected under 35 U.S.C. § 103(a). Claims 5 and 8 were rejected as being obvious over Suzuki, combined with U.S. Patent No. 3,258,833, issued to Schuttler (hereinafter "Schuttler"). Claim 12 was rejected as being obvious over Suzuki, combined with U.S. Patent No. 5,983,496, issued to Hermanson ("Hermanson").

Independent Claim 1, as presently amended, has previously been summarized above. Dependent Claims 5 and 8 teach the method of Claim 1, where the workpiece is positioned within the spin die. Dependent Claim 12, as presently amended, teaches the method of Claim 1, where a return flange is formed at either one or both longitudinal end portions of the workpiece by turning a portion of the hem section located distally from the mating flange over on itself.

The Office Action admits that Suzuki fails to teach that the workpiece is positioned within the spin die. The Office Action cites the Schuttler reference as teaching the use of an outer die (2) and an inner die (5) in order to form the workpiece (6) against the outer die. The Office Action states that it would have been obvious to modify the teachings of the Suzuki reference to use an outer die, as taught by Schuttler, as an alternative spinning process. Applicant respectfully disagrees.

To establish a *prima facie* case of obviousness, all of the claim limitations must be taught or suggested by the prior art. Because Claims 5, 8, and 12 depend from Claim 1, these claims include all the features of Claim 1. As discussed above, Suzuki fails to teach each and every

feature of Claim 1, specifically a method of making a conical connector that is open at both ends, conforming either one or both longitudinal ends of the workpiece to the shape of the spin die, or forming a mating flange at either one or both of the longitudinal end portions of the workpiece.

The deficiencies of the Suzuki reference are not cured by the teachings of the Schuttler reference. First, the starting workpiece in the Schuttler reference is an annular ring. In contrast, the starting workpiece in the Suzuki reference is disk-shaped. Because the disk-shaped preform must be bent over a die for primary forming, the secondary shaping would logically take place on a die located within the workpiece, as shown in the Suzuki drawings. Therefore, it would not be obvious to alter the die placement from within the workpiece, as the Schuttler reference teaches, for secondary shaping. Furthermore, an outer die requires the use of an inner profiling roll. Inspection of the profiling roll (15, 18) in the Suzuki reference reveals that the angle of the roller in figure 2(I) would prevent its use within a capped, closed-end workpiece such as the one disclosed. Therefore, the use of an outer die as taught by Schuttler would not be possible without redesigning the profiling roll, and possibly the method of workpiece formation. The hypothetical combination of the Suzuki and Schuttler references thus fails to teach or suggest all of the claim elements. Accordingly, applicant respectfully submits that amended Claim 1 and dependent Claims 5 and 8 are not obvious over Suzuki in view of Schuttler because the hypothetical combination would not be obvious given the different workpiece starting shapes and profiling roll.

Finally, the Office Action admits that Suzuki fails to disclose forming a return flange. The Office Action cites Hermanson as teaching that it is known to spin a return flange (6) from flange stock (40) after forming the hem (5). However, the capped, closed-end workpiece of the Suzuki reference would only allow a return flange at the open end. Therefore, the hypothetical combination of the Suzuki and Hermanson references fails to teach or suggest a return flange

formed at either one or both of the longitudinal end portions of a workpiece, as now specified in Claim 12. Moreover, Hermanson is concerned with forming thin gauge HVAC ducting, while Suzuki is concerned with forming wheel rims. Accordingly, applicant respectfully submits that amended Claim 12 is not obvious over Suzuki in view of Hermanson.

In view of the above remarks, applicant respectfully submits that Claims 5 and 8 are not obvious over the Suzuki reference in view of the Schuttler reference and should now be found allowable. Applicant further submits that amended Claim 12 is not obvious over Suzuki in view of Hermanson, and should also now be found allowable.

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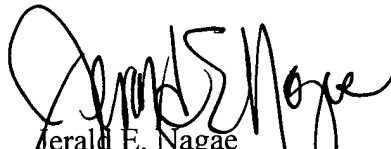
### CONCLUSION

In view of the foregoing remarks, applicant respectfully requests reconsideration and allowance of all claims. Applicant respectfully submits that independent Claim 1 as well as dependent Claims 2-12 are allowable for the reasons discussed above. In addition, Claims 1, 2, 10, 11 and 12 have further limitations that distinguish over the cited references of record, whether taken individually or in hypothetical combination. Therefore, applicant respectfully submits that all claims in the present application should be found allowable.

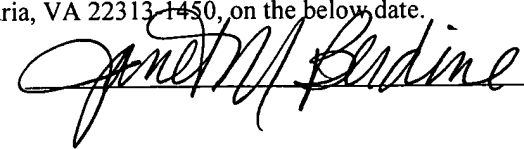
Applicant requests entry of the amendments, reconsideration, and allowance of all claims. The Examiner is invited to telephone the undersigned attorney if any issues remain.

Respectfully submitted,

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